

Title: Long-term trends in St. Louis River water quality

Author: Joel C. Hoffman¹

¹ US EPA Office of Research and Development, National Health and Environmental Effects Research Laboratory, Mid-Continent Ecology Division, 6201 Congdon Blvd, Duluth, Minnesota, 55804; phone: 218-529-5420; email: Hoffman.joel@epa.gov

Abstract: Water quality impairments caused by sewage and industrial waste discharge into the St. Louis River have been a primary concern for clean-up efforts throughout the last century. Surveys dating back to 1928 reveal severely degraded water quality in much of the river below Fond du Lac dam. The Minnesota Pollution Control Agency began regular monitoring in 1953 at MN Hwy 23 Bridge and by 1973 were sampling at multiple locations in the lower river. Long-term trends demonstrate a dramatic recovery in water quality, consistent with the establishment of the Western Lake Superior Sanitary District. Since 1973, there has been a significant increase in dissolved oxygen concentrations, as well as declines in total suspended solids and total phosphorous (TP) concentrations throughout the lower river. Total inorganic nitrogen has also declined at the Hwy 23 Bridge (annual mean = 0.20 mg L⁻¹), but, after an initial decline, has recently increased at Blatnik Bridge (annual mean = 0.42 mg L⁻¹). Nutrient and sediment targets should be evaluated in the context of current biogeochemical processes and historical pollution sources. Current annual mean TP concentrations are higher at Blatnik Bridge (0.04 mg L⁻¹) than at the Hwy 23 Bridge (0.03 mg L⁻¹). Recent surveys indicate that sediments above Grassy Point remain a source of phosphorous and nitrogen to the river. Long-term data, however, demonstrate that the rate of TP reduction has increased faster in the lower river than the upper river since the mid-1990s, implying a significant, positive change in nutrient dynamics in the lower river.